

Abstract

Title: Determining the relationship of spiroergometric testing on the canoe ergometer and in canoe sprint by elite competitors.

Objectives: The aim of the study was to determine the relationship between the results of aerobic exercise diagnostics in canoeing and on the canoe ergometer by Czech national team members in canoe sprint.

Methods: Within our study we tried to find out and compare the physiological response of two functional load exercise diagnostics in canoeing and on the canoe ergometer. To obtain the functional values of physiological indicators in both tests we used mobile spiroergometric equipment Cortex Metamax 3B and sport tester Polar RS 800.

Results: Testing canoeists paddling on flat water reached the following average functional values: maximal heart rate (HR) 181 min^{-1} ($\pm 3,9$), maximal values of blood lactate (LA) $8,04 \text{ ml.l}^{-1}$ ($\pm 1,6$), maximal oxygen consumption (VO_2max) $51,6 \text{ ml.kg.min}^{-1}$ ($\pm 6,7$), maximal ventilation (VE_{max}) $140,2 \text{ l.min}^{-1}$ ($\pm 26,5$), respiratory rate (RR) 51 min^{-1} ($\pm 3,7$), metabolic load (R_{max}) $1,14$ ($\pm 0,07$) and anaerobic threshold (ANT) 166 ($\pm 7,2$). When paddling the canoe ergometer, they reached the average maximum values: maximal heart rate (HR) 181 min^{-1} ($\pm 5,2$), maximal values of blood lactate (LA) $9,1 \text{ mmol.l}^{-1}$ ($\pm 2,9$), maximal oxygen consumption (VO_2max) $56,4 \text{ ml.kg.min}^{-1}$ ($\pm 6,6$), maximal ventilation (VE_{max}) $147,9$ (± 34), respiratory rate (RR) $56,9 \text{ rate.min}^{-1}$ ($\pm 4,88$), metabolic load (R_{max}) $1,13$ ($\pm 0,04$) and anaerobic threshold (ANT) 169 min^{-1} (± 6). The difference between the resulting values measured on the canoe ergometer and while canoeing is in a range from 0 to 12,09 %. There was found a high correlation (r) in four of seven observed values of physiological parameters: LA ($r = 0,810$), VO_2max ($r = 0,888$), VE_{max} ($r = 0,976$) a ANT ($r = 0,839$). On the other hand, no correlation was found in values: HR ($r = 0,597$), R_{max} ($r = 0,128$) and RR ($r = 0,359$).

Keywords: Canoe sprint, spiroergometry, canoe ergometer, training indicators testing, Cortex Metamax 3B